

CLAIMS

1. An control apparatus for an industrial machine comprising:

a submodule including a first memory of electrically rewritable nonvolatile type to store an industrial machine control program, the submodule executing the industrial machine control program stored in the first memory to control an industrial machine;

a read out drive reading out a data for rewriting the industrial machine control program from a memory module; and

a main module including a second memory having a rewrite control program stored therein to rewrite the industrial machine control program, and a third memory having a general control program stored therein to control the submodule, in an ordinary mode the main module executing the general control program stored in the third memory to cause the submodule to execute the industrial machine control program and control the industrial machine, in a program rewrite mode the main module executing the rewrite control program stored in the second memory to rewrite the industrial machine control program stored in the first memory, using the data read out by the read out drive.

2. The control apparatus according to claim 1, wherein the read out drive reads out a data for rewriting the general control program from the memory module, and

in the program rewrite mode, the main module executes the rewrite control program to rewrite the general control program stored in the third memory, using the data read out by the read out drive.

3. The control apparatus according to claim 1, wherein the read out drive reads out a data for

rewriting the rewrite control program from the memory module, and

in the program rewrite mode, the main module loads the rewrite control program stored in the second memory into a RAM in the main module, and executes the rewrite control program in the RAM to rewrite the rewrite control program stored in the second memory, using the data read out data by the read out drive.

4. The control apparatus according to claim 1, wherein the submodule includes an individual rewrite program stored in the first memory to rewrite the industrial machine control program,

in the program rewrite mode, the main module executes the rewrite control program to send a rewrite instruction to the submodule, and

the submodule executes the individual rewrite program stored in the first memory to rewrite the industrial machine control program, using the data read out by the read out drive.

5. The control apparatus according to claim 4, wherein the read out drive reads out a data for rewriting the individual rewrite program from the memory module, and

in the program rewrite mode, the main module executes the rewrite control program to rewrite the individual rewrite program, using the data read out by the read out drive.

6. The control apparatus according to claim 1, wherein the submodule has a submodule-identifier-holder to hold an identifier for identifying itself,

the read out drive reads out the data for rewriting the industrial machine control program associated with the

identifier, from the memory module, and

in the program rewriting mode, the main module executes the rewrite control program to acquires the identifier from the submodule, and rewrites the industrial machine control program in the submodule having the acquired identifier, using the data associated with the acquired identifier read out by the read out drive.

7. The control apparatus according to claim 1, wherein the submodule includes a version-information-holder to hold version information of the industrial machine control program stored in the first memory,

the read out drive reads out the data for rewriting the industrial machine control program associated with the version information, from the memory module, and

in the program rewriting mode, the main module executes the rewrite control program to compares the version information held in the submodule with the version information included in the data read out by the read out drive, and when a result of the comparison satisfies a predetermined condition, the main module rewrites the industrial machine control program.

8. The control apparatus according to claim 1, wherein the first memory has a program area to store the industrial machine control program and a data area to store display data to be displayed on a display section of the industrial machine,

the read out drive reads one or both of the data for rewriting the industrial machine control program(a first data) and a data for rewriting the display data(a second data) from the memory module, and

in the program rewriting mode, the main module executes the rewrite control program to rewrite one or both of the industrial machine control program in the program

area and the display data in the data area, using one or both of the first data and the second data read out by the read out drive.

9. The control apparatus according to claim 8, wherein the first data and the second data respectively include index data for identification of themselves, and

the main module discriminates the first data and the second data on the basis of the index data, and writes one or both of the first data and the second data read out by the read out drive, into one or both of the program area and the data area.

10. The control apparatus according to claim 1, wherein the submodule, the read out drive and the main module are connected to the same bus.

11. The control apparatus according to claim 1, wherein the read out drive includes a connector into which the memory module is to be inserted.

12. An industrial machine system comprising:

an industrial machine to operate predetermined processings;

a submodule including a first memory of electrically rewritable nonvolatile type to store an industrial machine control program to control the industrial machine, the submodule executing the industrial machine control program to control the industrial machine;

a read out drive reading out a data for rewriting the industrial machine control program from a memory module; and

a main module including a second memory having a rewrite control program stored therein to rewrite the industrial machine control program, and a third memory

having a general control program stored therein to control the submodule, in an ordinary mode the main module executing the general control program stored in the third memory to cause the submodule to execute the industrial machine control program and control the industrial machine, in a program rewrite mode the main module executing the rewrite control program stored in the second memory to rewrite the industrial machine control program stored in the first memory, using the data read out by the read out drive.

13. The industrial machine system according to claim 12, wherein the submodule includes an individual rewrite program stored in the first memory to rewrite the industrial machine control program,

in the program rewrite mode, the main module executes the rewrite control program to send a rewrite instruction to the submodule, and

the submodule executes the individual rewrite program stored in the first memory to rewrite the industrial machine control program, using the data read out by the read out drive.

14. The industrial machine system according to claim 12, wherein the submodule, the read out drive and the main module are connected to the same bus.

15. The industrial machine system according to claim 14, wherein the read out drive includes a connector into which the memory module is to be inserted.

16. The industrial machine system according to claim 12, wherein the industrial machine is a die casting machine, an injection molding machine or a machine tool.

17. A method of updating a program for controlling an industrial machine, comprising:

in an ordinary mode, a main module executes a general control program stored in a first memory in the main module to cause a submodule connected to the same bus as the main module to execute an industrial machine control program stored in a second memory of electrically rewritable nonvolatile type in the submodule and control an industrial machine, and

in a program rewrite mode, the main module executes a rewrite control program stored in a third memory in the main module to make a read out drive which is connected to the same bus read out a data for rewriting the industrial machine control program from a memory module, and rewrites the industrial machine control program stored in the second memory, using the data read out by the read out drive.

18. The method of updating a program for controlling an industrial machine according to claim 17,

wherein in the program rewrite mode, the main module sends a rewrite instruction to the submodule, and

the submodule executes an individual rewrite program stored in the second memory in the submodule to rewrite the industrial machine control program, using the data read out by the read out drive.